

What is claimed is:

1. A design support apparatus comprising: an input reception unit; a strength calculation unit; a stress calculation unit; and a comparison report unit,
wherein:
 - 5 said input reception unit receives an input of a parameter name of a product to be designed and a parameter value associated with the parameter name;
said strength calculation unit calculates a strength value of the product to be designed using the parameter name and the parameter value whose input has been received, in accordance with a predetermined calculation procedure;
 - 10 said stress calculation unit calculates a value (stress value) of a stress which is applied to the product to be designed using the parameter name and the parameter value whose input has been received, in accordance with a predetermined calculation procedure; and
said comparison report unit ~~compares the calculated strength value with the~~
15 ~~calculated stress value~~, and reports report information which is associated with the comparison in a case where the comparison satisfies a predetermined condition.
2. A design support apparatus comprising: a definition attribute dictionary unit; a strength dictionary unit; a stress dictionary unit; a comparison report dictionary unit; an input reception unit; a definition attribute obtaining unit; a strength obtaining unit; a stress 20 obtaining unit; a report information obtaining unit; a strength calculation unit; a stress calculation unit; and a comparison report unit,
wherein:
said definition attribute dictionary unit stores a definition attribute name, parameter names which relate to the definition attribute name, and remarks about whether the
25 respective parameter names are a control attribute or a stress attribute, in association with one another;
said strength dictionary unit stores a strength name, a parameter name of a control

attribute which is necessary for calculating the strength name, and a procedure for calculating a value (strength value) associated with the strength name using a value (parameter value) associated with the parameter name;

5 said stress dictionary unit stores a stress name, a parameter name which relates to the stress name, and a procedure for calculating a value (stress value) associated with the stress name using a value (parameter value) associated with the parameter name;

said comparison report dictionary unit stores a strength name, a stress name, comparison means for comparing the strength name and the stress name, and report information to be reported in a case where a result of the comparison satisfies a 10 predetermined condition, in association with one another;

said input reception unit receives an input of definition attribute names of a product to be designed;

said definition attribute obtaining unit obtains a definition attribute name which is stored in said definition attribute dictionary unit from among the input definition attribute 15 names, parameter names which relate to the obtained definition attribute name, and remarks about whether the respective parameter names are a control attribute or a stress attribute;

said strength obtaining unit obtains a strength name which can be calculated using any of the obtained parameter names that is a control attribute, and a procedure for 20 calculating a strength value associated with the strength name, from said strength dictionary unit;

said stress obtaining unit obtains a stress name which can be calculated using any of the obtained parameter names that is a stress attribute, and a procedure for calculating a stress value associated with the stress name, from said stress dictionary unit;

25 in a case where the obtained strength name which can be calculated and the obtained stress name which can be calculated are stored in association with each other in said comparison report dictionary unit, said report information obtaining unit obtains a

comparison procedure which is stored in association with those strength name and stress name, and report information to be reported in a case where a result of the comparison satisfies a predetermined condition;

in a case where the comparison procedure and the report information are obtained 5 by said report information obtaining unit, said input reception unit further receives an input of a parameter value associated with any of the obtained parameter names that is a control attribute and a parameter value associated with any of the obtained parameter names that is a stress attribute;

said strength calculation unit calculates a strength value in accordance with the 10 obtained procedure for calculating a strength value, using the input parameter value associated with any of the obtained parameter names that is a control attribute;

said stress calculation unit calculates a stress value in accordance with the obtained procedure for calculating a stress value, using the input parameter value associated with any of the obtained parameter names that is a stress attribute; and

15 said comparison report unit compares the calculated strength value with the calculated stress value in accordance with the obtained comparison procedure, and reports the obtained report information in a case where a result of the comparison satisfies a predetermined condition.

3. The design support apparatus according to claim 2, further comprising: a 20 control attribute dictionary unit; and a substitution relation obtaining unit, wherein:

said control attribute dictionary unit stores, in a case where a parameter value associated with a parameter name which is a control attribute can be substituted by a parameter value associated with another parameter name which is a control attribute, the 25 parameter name which can be used as substitution and the parameter name which can be substituted, as a substitution relation;

said substitution relation obtaining unit obtains a pair of parameter names which are

control attributes and stored in said control attribute dictionary unit as a substitution relation, from among the obtained parameter names which are control attributes;

5 said input reception unit further receives, in a case where any of the obtained parameter names that is a control attribute is the parameter name which is indicated by the obtained substitution relation as can be substituted, an input of a parameter value associated with the parameter name which can be substituted, or a parameter value associated with the parameter name which can be used as substitution; and

10 in a case where the obtained procedure for calculating a strength value designates use of the parameter value associated with the parameter name which is indicated by the obtained substitution relation as can be substituted and said input reception unit receives an input of the parameter value associated with the parameter name which can be used as substitution instead of the parameter value associated with the parameter name which can be substituted, said strength calculation unit calculates a strength value by substituting the parameter value associated with the parameter name which can be substituted, by the 15 parameter value associated with the parameter name which can be used as substitution.

4. The design support apparatus according to claim 3, wherein:

in a case where a parameter value associated with a parameter name which is a control attribute can be calculated in accordance with a calculation procedure using a parameter value associated with another parameter name which is a control attribute, said 20 control attribute dictionary unit further stores the calculation procedure, the parameter name (calculation-use parameter name) which is used in the calculation procedure, and the parameter name (calculation result parameter name) which is a result of the calculation procedure, as a calculation relation;

said substitution relation obtaining unit obtains a calculation relation which indicates 25 any of the obtained parameter names that is a control attribute as a calculation result parameter name and its corresponding calculation-use parameter name, from said control attribute dictionary unit;

in a case where any of the obtained parameter name that is a control attribute is the calculation result parameter name of the obtained calculation relation, said input reception unit further receives an input of a parameter value associated with the calculation result parameter name, or a parameter value associated with the calculation-use parameter name; and

in a case where the obtained procedure for calculating a strength value designates use of the parameter value associated with the calculation result parameter name of the obtained calculation relation and said input reception unit receives an input of the parameter value associated with the calculation-use parameter name instead of the parameter value associated with the calculation result parameter name, said strength calculation unit obtains the calculation procedure of the calculation relation from said control attribute dictionary unit, calculates a parameter value in accordance with the calculation procedure using the parameter value associated with the calculation-use parameter name whose input has been received, and calculates the strength value by substituting the parameter value associated with the calculation result parameter name by the calculated parameter value.

5. The design support apparatus according to claim 2, wherein:
said definition attribute dictionary unit further stores a parent-child relation between a definition attribute name and another definition attribute name; and

20 in a case where any parent-child relation in which a definition attribute name which has already been obtained by said definition attribute obtaining unit is a child is stored in said definition attribute dictionary unit, said definition attribute obtaining unit obtains a definition attribute name which is a parent of the parent-child relation, parameter names which relate to the parent definition attribute name, and remarks about whether the respective parameter names are a control attribute or a stress attribute.

6. The design support apparatus according to claim 5, wherein
said definition attribute dictionary unit can store a parent-child relation in which a

given definition attribute name is a parent and another definition attribute name is a child, and also a parent-child relation in which the given definition attribute name is a child and the another definition attribute name is a parent.

7. The design support apparatus according to claim 2, wherein:

5 said definition attribute dictionary unit further stores a parent-child relation between a definition attribute name and another definition attribute name; and

in a case where any parent-child relation in which a definition attribute name which has already been obtained by said definition attribute obtaining unit is a parent is stored in said definition attribute dictionary unit and there are a plurality of definition attribute 10 names each of which is a child of the parent definition attribute name, said definition attribute obtaining unit receives an input for selecting one or more of the plurality of child definition attribute name(s), and obtains the selected child definition attribute name(s), parameter names which relate to the selected child definition attribute name(s), and remarks about whether the respective parameter names are a control attribute or a stress 15 attribute.

8. The design support apparatus according to claim 7, wherein

said definition attribute dictionary unit can store a parent-child relation in which a given definition attribute name is a parent and another definition attribute name is a child, and also a parent-child relation in which the given definition attribute name is a child and 20 the another definition attribute name is a parent.

9. The design support apparatus according to claim 2, wherein:

said definition attribute dictionary unit further stores an exclusive relation between a definition attribute name and another definition attribute name;

report information stored in said comparison report dictionary unit includes a 25 definition attribute name which relates to the report information itself; and said comparison report unit reports, among obtained report information, report information whose corresponding predetermined condition is satisfied and which does not

include a definition attribute name which is stored in said definition attribute dictionary unit as constituting an exclusive relation with any of the input definition attribute names.

10. The design support apparatus according to claim 2, wherein:
said input reception unit further receives an input of a to-be-excluded definition
5 attribute name which should be excluded from the product to be designed;
report information stored in said comparison report dictionary unit includes a
definition attribute name which relates to the report information itself; and
said comparison report unit reports, among the obtained report information, report
information whose corresponding predetermined condition is satisfied and which does not
10 include the input to-be-excluded definition attribute name.

11. The design support apparatus according to claim 2, wherein:
report information stored in said comparison report dictionary unit includes a
definition attribute name which relates to the report information itself; and
said comparison report unit reports, among the obtained report information, report
15 information whose corresponding predetermined condition is satisfied and at least one of
whose including definition attribute names is any of the input definition attribute names.

12. A design support method comprising: an input receiving step; a strength
calculating step; a stress calculating step; and a comparison reporting step,
wherein:
20 said input receiving step receives an input of a parameter name of a product to be
designed and a parameter value associated with the parameter name;
said strength calculating step calculates a strength value of the product to be
designed using the parameter name and parameter value whose input has been received,
in accordance with a predetermined calculation procedure;
25 said stress calculating step calculates a value (stress value) of a stress which is
applied to the product to be designed using the parameter name and parameter value
whose input has been received, in accordance with a predetermined calculation

procedure; and

5 said comparison reporting step compares the calculated strength value with the calculated stress value and reports report information which is associated with a result of the comparison, in a case where the result of the comparison satisfies a predetermined condition.

13. A design support method which:

10 refers to: a definition attribute dictionary unit which stores a definition attribute name, parameter names which relate to the definition attribute name, and remarks about whether the respective parameter names are a control attribute or a stress attribute, in association with one another;

15 a strength dictionary unit which stores a strength name, a parameter name of a control attribute which is necessary for calculating the strength name, and a procedure for calculating a value (strength value) associated with the strength name using a value (parameter value) associated with the parameter name;

20 a stress dictionary unit which stores a stress name, a parameter name which relates to the stress name, and a procedure for calculating a value (stress value) associated with the stress name using a value (parameter value) associated with the parameter name; and

25 a comparison report dictionary unit which stores a strength name, a stress name, comparison means for comparing the strength name and the stress name, and report information to be reported in a case where a result of the comparison satisfies a predetermined condition, in association with one another; and

comprises: an input receiving step; a definition attribute obtaining step; a strength obtaining step; a stress obtaining step; a strength calculating step; a stress calculating step; a report information obtaining step; and a comparison reporting step,

wherein:

said input receiving step receives an input of definition attribute names of a product

to be designed;

5 said definition attribute obtaining step obtains a definition attribute name which is stored in the definition attribute dictionary unit from among the input definition attribute names, parameter names which relate to the obtained definition attribute name, and 5 remarks about whether the respective parameter names are a control attribute or a stress attribute;

10 said strength obtaining step obtains a strength name which can be calculated using any of the obtained parameter names that is a control attribute, and a procedure for calculating a value (strength value) associated with the strength name, from the strength dictionary unit;

15 said stress obtaining step obtains a stress name which can be calculated using any of the obtained parameter names that is a stress attribute, and a procedure for calculating a value (stress value) associated with the stress name, from the stress dictionary unit;

20 in a case where the obtained strength name which can be calculated and the obtained stress name which can be calculated are stored in association with each other in the comparison report dictionary unit, said report information obtaining step obtains a comparison procedure which is stored in association with those strength name and stress name, and report information to be reported in a case where a result of the comparison satisfies a predetermined condition;

25 in a case where the comparison procedure and the report information are obtained in said report information obtaining step, said input receiving step further receives an input of a parameter value associated with any of the obtained parameter names that is a control attribute and a parameter value associated with any of the obtained parameter names that is a stress attribute;

30 said strength calculating step calculates a strength value in accordance with the obtained procedure for calculating a strength value, using the input parameter value associated with any of the obtained parameter names that is a control attribute;

said stress calculating step calculates a stress value in accordance with the obtained procedure for calculating a stress value, using the input parameter value associated with any of the obtained parameter names that is a stress attribute; and

 said comparison reporting step compares the calculated strength value with the 5 calculated stress value in accordance with the obtained comparison procedure, and reports the obtained report information in a case where a result of the comparison satisfies a predetermined condition.

14. A program for causing a computer to act as the design support apparatus according to any one of claims 1 to 11.